Jennings, Kotinsky, Middleton, Miller, Paine, Pierce, Rohwer, Sanford, Sasscer, Schwarz, Snyder, Speare, Webb, White, members, and A. J. Flebert, R. M. Foutz, W. V. King, Albert Lepper, H. F. Loomis, H. S. McConnell, C. J. Pierson, and Delmar Webb, visitors.

At the end of the regular program, the meeting was brought to a delightful close by the presentation to the Saengerbund by the Entomological Society of a nearly life-sized portrait of Mr. E. A. Schwarz, honorary president of our Society and for many years a member of the Saengerbund. President Ely made the presentation address in which he spoke feelingly of Mr. Schwarz's long connection with the Society and the high place he holds in the esteem of his fellow-members. At the close of his remarks the president read a letter from Dr. L. O. Howard setting forth his disappointment at not being able to be present to take part in the presentation and expressing in fitting terms his admiration and affection for Mr. Schwarz.

The gift was accepted, on behalf of the Saengerbund, by its president, Mr. Albert Lepper, who expressed the gratification and appreciation of his Society and in a few appropriate remarks told of the esteem in which Mr. Schwarz is held by his associates in the Saengerbund.

Mr. Schwarz expressed his appreciation of this demonstration of affection and regard on the part of his fellow society-members and with characteristic modesty stated: "It is more than I deserve. Whatever benefit I may have been to the Society or whatever help I may have been, is sufficient reward in itself."

The following program was presented:

TWO NEW CHALCIDS FROM THE SEEDS OF AMELANCHIER.[1]

By R. A. Cushman,

Entomological Assistant, Bureau of Entomology.

No chalcid has heretofore been recorded as breeding in the seeds of any species of the genus *Amelanchier*. Discovery that there is such an insect developing in the seeds of the shad bush (*A. cana-*

[1] Published by permission of the Secretary of Agriculture.

densis) was first made by the writer on July 1, 1914, when a small package of the berries was received at North East, Pa., from Mr. Fred E. Brooks of the Bureau of Entomology, stationed at French Creek, W. Va. A few of the seeds were found to contain full-grown chalcid larvae. Closer examination of these larvae a few days later disclosed the fact that they were apparently of two species, the mandibles in one form being dentate and in the other edentate.

On July 18, of the same year, larvae were found in the seeds of berries collected by the writer near North East, Pa.

Parts of both of these lots of material were placed in breeding jars and kept until the spring of 1915, but nothing was reared.

No further information concerning the chalcids was obtained until June 21, 1915, when one female of each of two species of *Syntomaspis* were beaten from a shad bush bearing nearly ripe fruit at North East. These were placed in cages on the tree, and one was later observed to attempt oviposition in a nearly ripe berry. No activity of this sort was observed for the other species.

In the summer of 1915 more berries were collected at North East and more received from Mr. Brooks from both French Creek and Pickens, W. Va. All of these lots were found by examination to contain some infested seeds. The bulk of each lot was placed in a jar for rearing.

On May 26, 1916, all the seeds in the French Creek lot were examined. Nearly all of the living insects found were in the pupal stage, most of them nearly ready for transformation, but a few were still in the larval stage. All of the latter had the mandibles acute and toothless. All of these stages were removed from the seeds, placed in a watch glass, and covered. on May 28, three female specimens of a species of *Megastigmus* were reared. On the same date three females and one male of the same species emerged from the berries from Pickens, W. Va. On June 1, emergence ceased and the contents of the Pickens and North East cages were examined. This resulted in the finding of many dead adults, all *Megastigmus*. Up to this time there has been recorded from the Pickens lot 17 females and 3 males. The dead in this lot totaled 28 females and 1 male. Although the first specimens seen were found on May 28, the finding of so many dead specimens so soon after that date would seem to indicate that emergence probably began some time earlier. The balance of the immature stages from the French Creek lot, both larvae and pupae, were put in alcohol. There was no further rearing from the North East berries, but on June 10 emergence from the Pickens lot began again. This time,

however, the insects reared were a *Syntomaspis* of the same species as the one observed to attempt oviposition in the previous season. Before this time, on May 31, one male of the species had appeared in the Pickens material. Emergence of *Syntomaspis* continued until June 16.

The result of the rearings led to the suspicion that the *Syntomaspis* was parasitic on the *Megastigmus*, and support of this idea was secured when examination of a seed from which a *Syntomaspis* had emerged disclosed an exuvium of a full-grown larva with edentate mandibles and a dead and shrivelled larva with dentate mandibles. Whether this is the normal habit of *Syntomaspis* can not be stated definitely, but the much later emergence of the *Syntomaspis*, together with its comparative rarity and the condition of the seeds of the berries at the time the adults are active all indicate that such is the case.

The finding of the traces of both species in the single seed also fixed the relation between the two species of adults, the larva with dentate mandibles being that of *Megastigmus* and the one with edentate mandibles that of *Syntomaspis*. Further proof of the identity of the larvae was obtained on July 9, when berries exposed to the attack of *Megastigmus* in cages and protected against subsequent attack were found to contain larvae with dentate mandibiles.

The two species of insects concerned, both new to science, are described herewith.

Megastigmus amelanchieris n. sp.

In Crosby's table to North American species of the genus[1] runs to *brevicaudis* Ratzeburg, the ovipositor being barely as long as the abdomen and the stigmal club broadly oval (Plate I, fig. f). It is easily distinguishable from that species by the color of the pronotum, which is black above and yellow at the sides, and that portion of the scutellum beyond the groove being smooth and polished, while in *brevicaudis* it is finely aciculate.

Female.—Length 2.6 mm., abdomen 1 mm., ovipositor 1 mm. Head viewed from in front slightly wider than long, viewed from above with the temples as broad as the eyes and nearly angulately rounded; eyes slightly divergent below; clypeus very short and broadly emarginate at apex; malar space about as long as basal width of mandibles; sides of face obliquely striate with a few large, setigerous punctures above the antennal fossae; vertex, frons, and superior orbits transversely striate, with a few large, shallow pits on orbits and vertex; anterior ocellus somewhat larger than lateral ocelli; ocell-ocular and interocellar lines equal

[1] Crosby, C. P., Ann. Ent. Soc. Am., Vol. VI, 1913, p. 156.

and slightly more than half as long as postocellar line; pronotum transversely rugose above, obliquely striate and with scattered pits laterally; mesonotum transversely, arcuately striate, the striae strongest on mesoscutum and weakest on the scutellum, the latter being smooth beyond the crenulate transverse furrow; mesopleurum coarsely, granularly opaque above the suture, vertically striate below; propodeum coarsely roughened, with some oblique rugosity basally; stigmal club broadly oval; basal vein weak but distinctly indicated; abdomen about as high as long, polished; ovipositor as long as abdomen, strongly upcurved.

Black, with face, mouth, orbits except a broad interruption at top of eyes, in which is a brownish spot, scape and pedicel below, sides of pronotum, legs, except hind coxae and base of middle coxae, and tegulae lemon yellow; sides of abdomen more or less brown stained.

Male.—Length 2.3 mm., abdomen 1 mm. Very like female, with sculpture throughout weaker, abdomen very strongly compressed, first tergite in side view much longer than high; stigmal club considerably broader; antennae yellow below throughout.

Host.—Seeds of *Amelanchier canadensis.*

Type locality.—Pickens, W. Va.

Other localities.—French Creek, W. Va., and North East, Pa.

Type.—Cat. No. 20964 U. S. N. M.

Described from a considerable series of specimens, including two males, from the three localities, those from Pickens, W. Va., under Quaintance No. 10930, those from French Creek, W. Va., under Quaintance No. 10929, and those from North East, Pa., under Quaintance No. 11014. The two lots of breeding material from West Virginia were collected by Mr. Fred E. Brooks of the Bureau of Entomology, but all specimens were reared by the author at North East, Pa.

The principal variations are in size, 2–2.6 mm. in the female, and in the extent of the orbital maculation, some of the specimens having the yellow color much less extensive above and with a nearly complete interruption in the cheek. Some of the specimens, especially the smaller ones, have the sculpture less strong throughout.

Syntomaspis amelanchieris n. sp.

Female.—Length 2.6 mm., abdomen 1.2 mm., ovipositor 1.5 mm. Head in front view round, slightly wider than long, viewed from above strongly transverse, the temple sharply, roundly sloping, head shagreened, the sculpture finer and fainter on face; width of face equal to height of eyes, the latter parallel within; clypeus polished at apex and with a median tooth; malar space subequal to basal width of mandible; interocellar line half as long as postocellar and slightly shorter than ocellocular; middle antennal joints wider than long. Thorax above shagreened with seat-

tered punctures, pronotum transversely striate; thorax laterally shagreened, mesopleurum above pleural suture polished; propodeum shagreened, subpolished medially; coxae obscurely shagreened; abdomen polished, faintly reticulate laterally; ovipositor slightly longer than abdomen.

Metallic green with bronzy reflections, this color extending to the coxae and femora; hind tibiae dark brown, legs otherwise yellow; scape yellow, antennae otherwise blackish with purplish bronze luster.

Male.—Length 2.3 mm. In sculpture and color very similar to female.

Type locality.—Pickens, W. Va.

Other locality.—North East, Pa.

Type.—Cat. No. 20968 U. S. N. M.

Described from five females and one male reared by the author May 31 to June 16, 1916, under Quaintance No. 11013, from seeds of *Amelanchier canadensis* in company with *Megastigmus amelanchieris* Cush. The material collected at the type locality by Mr. Fred E. Brooks, and one female captured by the author on the same plant at North East, Pa., June 21, 1915, and later observed to attempt oviposition in an *Amelanchier* berry.

The specimens show very little variation in size or sculpture. Paratypes *d* and *e* have distinct purplish reflections at the base of the abdomen.

HABITS OF MEGASTIGMUS.

At the time when emergence of *Megastigmus* was in progress the *Amelanchier* berries were from three-sixteenths to one-fourth inch in diameter, and the seed contents semifluid to gelatinous.

Oviposition takes place in late May and early June at the latitude of North East. In oviposition the female inserts her ovipositor through the side of the berry. The egg has not been found, but, as is the case in all seed-chalcids, the eggs of which are known, it is undoubtedly deposited within the tissue of the seed. The larva consumes the entire seed contents and attains full growth by shortly after the first of July. By this time the fruit is ripening and falling to the ground, and the seed coat has become hardened and brown. Infested seeds are less plump and more irregular in form than sound seeds and will float on water, while sound seeds will sink. Within the seed the larva contracts and becomes less strongly curved and remains in this condition until the following spring, when it pupates and a few days later emerges as the adult insect. Thus in the development of a single generation very nearly the entire year is consumed.

Thus far the only known host of this species is *Amelanchier canadensis* and the only localities French Creek and Pickens, W. Va., and North East, Pa. Through the kindness of Mr. Lewis

H. Weld of the faculty of Evanston Academy, Evanston, Ill., a large lot of berries of the 1916 crop were received from Evanston, but these were apparently uninfested. A large lot of the berries of the purple fruited *Amelanchier oligocarpa* were also received from Mr. Brooks, who had collected them in the mountains of Tucker Co., W. Va. No infestation was found in this lot.

HABITS OF SYNTOMASPIS.

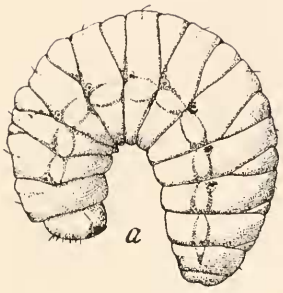
The adults of *Syntomaspis* emerge in the spring from two to three weeks later than *Megastigmus*. At this time the berries are nearly full grown, and the seeds are beginning to harden. Oviposition takes place during the latter part of June, and the insect passes the winter as a somewhat contracted larva within the seed.

LARVAE OF MEGASTIGMUS AND SYNTOMASPIS.

The larvae of the two species (Plate X, fig. *a Megastigmus* and fig. *c Syntomaspis*) are superficially very similar. Both are stout, white, footless grubs about 2.5 to 3 mm. long, tapering toward each end and curved toward the venter, that of *Megastigmus* being much the more strongly so. Both have spiracles on the anterior edges of the mesothoracic and metathoracic and first seven abdominal segments. The most striking difference between the larvae is found in the mandibles. As stated above those of *Syntomaspis* are edentate while those of *Megastigmus* have a series of strong teeth on the inner margin. The normal number of teeth is four, but occasionally one mandible in a pair has but three teeth, sometimes regularly spaced and sometimes as though there were four with the second tooth missing. The mandibles articulate with chitinous structures on the inner surface of the integument. In *Megastigmus* these are broad and strongly angulate at the outer superior and inferior angles. In *Syntomaspis* they are narrow and nearly semicircular without strong angulations. In making slide mounts of these structures it is difficult to maintain the normal position and relations, and the accompanying figures (Plate I, figs. *b* and *d*) drawn from slide mounts do not show them as they actually appear from a surface view of the face of the larva.

PUPA OF MEGASTIGMUS.

The pupa of the *Syntomaspis* has never been seen. That of the female of *Megastigmus* (Plate X, fig. *e*) is short with the head bent downwards and with the legs, antennae, and wing pads folded along the sides and venter in the manner usual with hymenopterous pupae. The ovipositor is curved upward close to the back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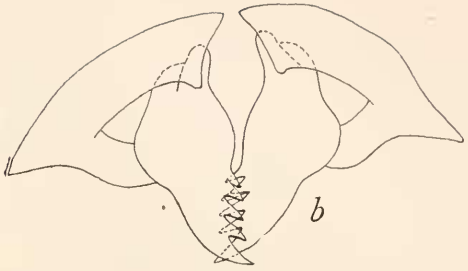
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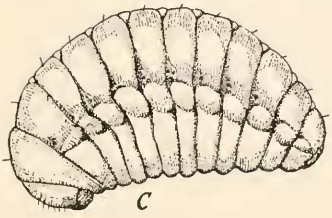
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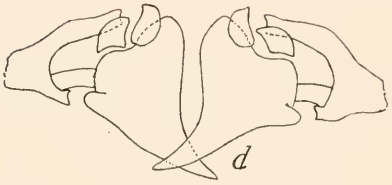
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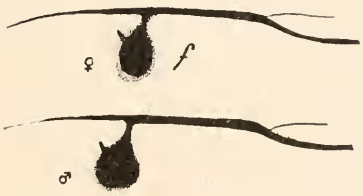
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and reaches nearly half way over the back of the abdomen. The male pupa is more slender and the abdomen is much narrower.

PLATE X.

Megastigmus amelanchieris Cush.

a.—Full-grown feeding larva.
b.—Mandibles and supporting ridges of same.
e.—Pupa.
f.—Stigmal clubs.

Syntomaspis amelanchieris Cush.

c.—Hibernating larva.
d.—Mandibles and supporting ridges of same.

PHOTOMICROGRAPHY AND ITS APPLICATION TO THE STUDY OF THE COCCIDAE.

BY E. R. SASSCER.[1]

In the discussion of this paper Mr. Schwarz inquired as to the best method of mounting coccidae for photomicrographing. Mr. Schwarz stated that glycerin mounts gave the best results, but that since most of the material that he had to examine is mounted in balsam he preferred that all be thus mounted. Mr. Baker suggested that for purposes of reproduction the photomicrographs should be retouched in order to bring out the important characters. To this Mr. Sasscer objected on the ground that this might lead to the overlooking by others of the characters thus intensified through their expecting to find them as conspicuous in the specimen as in the published figure. The paper was further briefly discussed by Messrs. Kotinsky, Ely, and Paine.

NOTES ON TWO SPECIES OF ACROBASIS, ESPECIALLY INJURIOUS TO PECANS.

BY J. B. GILL.[1]

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[1] Withdrawn from publication.